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ABSTRACT

Resilient Asian American students, who have shown outstanding performance and achievement in spite of adverse life conditions in urban schools, were compared with nonresilient, or marginal, students who have not done well academically. The focus was on the students' perceptions of their learning environments in mathematics. Other background variables were also considered. A stratified random sampling technique was used to select 180 resilient and 180 nonresilient Asian American students from the students at 6 urban middle schools in a multicultural district in the southern United States. Three standardized instruments, the Multidimensional Motivational Instrument, the Classroom Environment Scale, and the Instructional Learning Environment Questionnaire were adopted for use in this study. The social psychological dimensions of the learning environment differed significantly between the resilient and nonresilient students. Resilient students were more attentive in mathematics instruction and classroom activities, and were more attached to classmates than nonresilient students. They exhibited significantly greater intrinsic desire to succeed and earn good grades, and they expected to do well. Parents of both resilient and nonresilient students in this study appeared to be equally interested and involved. Although the majority of these students spoke a language other than English before starting school, this did not appear to be a factor in their resilience. (Contains 4 tables and 52 references.) (SLD)

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Draft

Comparing Learning Environment of Resilient and Non-Resilient Asian American Students

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The rapid growth of Asian American students in urban public schools has presented a great challenge to educators. The great differences among Asian American students' achievement levels, the problems of cultural and language adjustments, and the increasing number of dropouts among Asian American students have confronted many students, teachers, parents, and administrators. Part of these problems originates from the shift of Asian American population from largely American born to immigrants. Part of these problems comes from the long-term neglect and failure to recognize the diversity among Asian American Students. Although numerous studies reported Asian American students' exceptional academic achievement and examined its contributing factors, including schooling, heredity, and culture (Brand, 1987; Collier & Powell, 1990; Karkhanis & Tsai, 1988; Peng, Owings, & Fetters, 1984; Sue & Okazaki, 1990, 1991), other studies found that a majority of Asian-American students struggle for their own identity and search for understanding and sensitivity to their needs. A few studies further examined acculturation of the Southeast and other subgroups of Asian American students, outlined their unique conditions of educational risk and designed special assessment procedures for them (Dao, 1991; Mau, 1990). Researchers have pointed out that some Asian ethnicity subgroups, such as Pacific Islanders, have not been as academically successful as other subgroups (Bradby & Owings, 1992). Divorky (1988) found that one quarter of Asian American students dropped out of schools in New York City, and Pacific Islanders had a dropout rate of 17.1% in San Diego, California. A statistical analysis report of the National Center for Education Statistics (NCES) showed that around 24% of Asian American eighth graders failed to achieve the basic level in reading and 23% failed in mathematics (Bradby & Owings, 1992). In addition, Asian American students' 10th-12th grade dropout rate has more than doubled between 1982 and 1992, whereas the dropout rates for African American and Hispanic students have greatly decreased (McMillen, Kaufman, & Whitener, 1994).

The disparities of reports reflect the diversity in learning environments and academic achievement of Asian American students. Inaccurate information of Asian American students as the "whiz kids" or "model minorities" has limited the development of educational programs that

address their individual needs. Some Asian American students do exceptionally well in urban schools despite the stressful living conditions while some others become students at risk of failure. Researchers need to identify variables associated with the differences and design strategies that may reduce these problems and enhance the learning of students at risk of academic failure (Cheng, 1989; Garcia, 1994; Nakanishi, 1995; Pang, 1990; Rutters, 1987; Slavin, 1989; Waxman, 1992).

Findings from recent research have indicated that a few of the educational problems are alterable and can be alleviated if we are able to identify differentiating variables. (Huang, 1995; Matsen, 1994; Wang & Gordon, 1994). It is important to examine Asian American students who have done well in schools despite environmental adversities and to see how they differ from less successful students. Peng, Lee, Wang, and Walberg (1992), for example, identified students of low socioeconomic (SES) status from urban communities whose combined reading and mathematics test scores were in the highest quartile on national achievement norms, and found that these resilient students had higher self-concepts and educational aspirations, and felt more internally controlled than non-resilient students. In other words, these researchers have identified some characteristics or attributes of "educational resilience." For the purpose of the present study, "educational resilience" is defined as "the heightened likelihood of success in school and other life accomplishments despite environmental adversities brought by early traits, conditions, and experiences" (Wang, Haertel, & Walberg, 1994, p. 46). By identifying the attributes of "educational resilience" among Asian American students, educators may be able to focus on the predictors of their academic success and design more effective educational interventions for non-resilient Asian American students.

In the present study, we examined two groups of Asian American students: (a) resilient students who have shown outstanding performance and achievement, despite adverse life conditions in urban schools, and (b) non-resilient or marginal students who come from similar adverse life conditions but have not done well academically in school.

The present study tries to address the educational enhancement for at-risk Asian American students by drawing upon two distinct and emerging theoretical frameworks: (a) educationally resilient students, and (b) classroom learning environments. Recent research has found that the improvement of teaching and learning can emerge by examining the classroom learning environment perceived by student themselves (Knight & Waxman, 1991; Walberg, 1976). How students perceive and react to their classroom instruction may be more important in terms of influencing student outcome than the quality of teaching behavior (Knight & Waxman, 1991; Walberg, 1976; Winne & Marx, 1982). McMillen, Kaufman, and Whitener (1994), for example, found that some of the most common reasons that students cited for dropping out were related to their experiences in the schools they left behind, including a general dislike for schools, failure in their schoolwork, and the feeling of not belong. Students actively process information and interpret classroom reality (Schunk, 1992: Weinstein, 1989). Their perceptions of instructional and classroom learning environments have been found to explain a significant amount of variance for both students' cognitive and affective outcomes (Fraser, 1986, 1989; Fraser, Walberg, Welch, & Hattie, 1987; Haertel, Walberg, & Haertel, 1981; Walberg, 1976; Waxman, Huang. Knight, & Owens, 1992). Furthermore, research has found that these outcomes can be improved by changing classroom environments in desired direction (Burden & Fraser; 1993; Fraser & Deer; 1989; Fraser, Malone, & Neale, 1989). Fostering an effective classroom learning environment has been suggested as a mean of enabling at-risk students to achieve in school (Padron, 1992; Pierce, 1994).

Purpose of The Study

While a large body of research has found that students' motivation and learning environments are important factors that contribute to student learning, very few studies have compared social psychological variables between resilient and non-resilient Asian American students. Therefore, the purpose of this study was to compare the two groups of students' perceptions of their learning environment in mathematics. In addition, other background and behavioral variables such as home language, academic aspirations, attendance record, and time

allocation of the two student groups were also examined since they have been found to be related to student academic achievement. Consequently, this study addresses two research questions:

(1) Are there significant differences between resilient and non-resilient Asian American students on their background and behavioral characteristics such as home language, academic aspirations, attendance record, and time allocation?

(2) Are there significant differences between resilient and non-resilient Asian American students in their learning environments in the dimensions of Involvement, Affiliation, Satisfaction, Parent Involvement, Academic Self-Concept, and Achievement Motivation?

Methods

Subjects

The present study was conducted in six middle schools from a multicultural school district located in a major metropolitan city in the south central region of the United States. The school district was selected for study because of its relatively high enrollment of Asian American students. About 20% of the students enrolled in the district were Asian American students. Among these Asian American students, about 47% were born in the United States, 14% in Vietnam, 11% in Pakistan, 7% in India, 6% in Philippine, 5% in China, 2% in Taiwan, and the rest 8% in Southeast Asia and other countries. Most of the students in the district came from lower- to middle-income families. During the school year, a district-wide Four-Step Problem Solving Test (Hofmann, 1986) was administered to all students. At the end of the spring semester, a student survey was conducted at all six middle schools to 7,000 students in the school district. A stratified random sampling technique was then used to select 180 resilient and 180 non-resilient students. Students were classified as educationally "resilient" if they (a) scored on or above 75%ile on the district administered standardized test, and (b) reported receiving mostly "A's" and "B's" in mathematics grades. Students were classified as "non-resilient" if they (a) scored on or below 25%ile on the district administered standardized test, and (b) reported receiving mostly "B's," "C's," "D's," or "F's" in mathematics grades this year. Each group has 120 students at each of the 6th, 7th, and 8th grade levels.

Instruments

Three standardized instruments were adapted and incorporated for use in the present study: (a) the Multidimensional Motivational Instrument (Uguroglu, Schiller, & Walberg, 1981; Uguroglu & Walberg, 1986), (b) the Classroom Environment Scale (Fraser, 1982, 1986), and (c) the Instructional Learning Environment Questionnaire (Knight & Waxman, 1989). All of the items on these instruments were modified to a "personal form" in the present study that elicits an individual student's responses to his/her role in their mathematics class, rather than a student's perceptions of the class as a whole (Fraser, 1991).

The Multidimensional Motivational Instrument (MMI) is a questionnaire that measures the motivation constructs of Achievement Motivation, Academic Self-Concept, and Social Self-Concept. The instrument has been found to have test-retest reliability and construct and predictive validities. For the present study, Achievement Motivation and Academic Self-Concept scales were used. A brief description of the scales and a sample item from each follows:

Achievement Motivation--the extent to which students feel the intrinsic desire to succeed and earn "good" grades in mathematics (e.g., When I have a hard problem in mathematics, I usually keep trying to solve it).

Academic Self-Concept--the extent to which students exhibit pride in their classwork and expect to do well in mathematics (e.g., I am proud of my work in mathematics).

The Classroom Environment Scale (CES) contains six scales. The content and concurrent validities of the CES have been established through correlational studies and classroom observation. Adequate internal consistency reliability coefficients were also obtained in previous studies (Fraser, 1982, 1986; Moos, 1979). For the present study, the Involvement and Affiliation scales were used. A brief description of the two scales and a sample item from each follows:

Involvement--the extent to which students participate actively and attentively in their mathematics class (e.g., In my mathematics class, I really pay attention to what the teacher is saying).

Affiliation--the extents to which students know, help, and are friendly toward each other in their mathematics class (e.g., I know other students in my mathematics class really well).

The Instructional Learning Environment Questionnaire (ILEQ) measures students' perceptions of seven aspects of instructional learning environment. It has been found to have adequate internal consistency reliability and test-retest reliability coefficients (Knight & Waxman, 1989; Waxman, Huang, Knight, & Owens, 1992). For the present study, only the Satisfaction and Parent Involvement scales were used. A brief description of the two scales and a sample item from each follows:

Satisfaction--the extent of students' enjoyment of their mathematics class and school work in mathematics (e.g., I enjoy the schoolwork in my mathematics class).

Parent Involvement--the extent to which parents are interested and involved in what their children are doing in mathematics (e.g., My parents often ask me about what I learned in mathematics).

Each scale from the three instruments includes four items and all of the items were measured on a four-point, Likert-type scale. A response of "not at all true" corresponds to the value of "1; "not very true," "2;" "sort of true," "3;" and "very true," "4." Students' responses to each item within the same scale were added and averaged. Consequently, a mean value of "4" indicates that the student responded agreeably to the scale, whereas a mean value of "1" indicates that the student responded disagreeably to the scale.

Several background items selected from the National Educational Longitudinal Study (NELS:88) were also included in the final survey (Ingels, Abraham, Karr, Spencer, & Frankel, 1990). These items included questions about students' (a) background characteristics (e.g., home

language), (b) academic aspirations (e.g., how far they will go in school), (c) attendance record (e.g., number of days missed), and (d) time allocation (e.g., time spent on homework).

Procedures

The scales from the three instruments and the background items from the NELS:88 survey were combined into one survey. The survey was administered concurrently during students' regular mathematics class by trained researchers near the end of the school year. We selected two scales from each of the three instruments because the school district only allowed us about 45 minutes to conduct the combined survey. Students were informed by the researchers that they were not tests and that completed questionnaires would not be seen by their teachers or other school personnel.

Chi-square tests were used to compare the frequencies of responses between resilient and non-resilient Asian American students on the items from the NELS:88 survey. A multivariate analysis of variance (MANOVA) was used to determine whether there are significant differences in the six learning environment dimensions between the two groups of students.

Validation of the Instrument

In order to ensure adequate reliability and validity of the six scales used in this study, internal consistency (Cronbach alpha) reliability and discriminant validity (correlations between scales) were conducted. These coefficients were calculated using individual student as the unit of statistical analysis. The results indicated that alpha coefficients of these scales ranged from .43 to .82 with a mean of .61; and the correlations between scales ranged from .05 to .60 with a mean of .31, suggesting that the survey instrument has adequate internal consistency reliability and discriminant validity. Table 1 presents the reliability and validity results.

Insert Table 1 about here

Since the students in this sample came from 51 different classrooms, we conducted an analysis of variance (ANOVA) with class as the main factor in order to determine its effect on

students' perceptions of their learning environment. Students from these various classrooms perceived significant differences ($p<.01$) for two of the six scales: Involvement and Affiliation. The eta^2 values for Involvement and Affiliation were .19 and .24 respectively, representing the portion of variance in these two learning environment scales accounted for by class membership.

Results

Table 2 presents the descriptive and chi-square results for resilient and non-resilient Asian American student groups. The results indicate that there was no statistically significant difference in language spoken before going to school between the two groups of students. Over 75% of students from both groups, however, indicated that they spoke a language other than English before they started school. Significantly fewer resilient students had been held back a grade in school than non-resilient students. Significantly more resilient than non-resilient Asian American students were very sure that they would graduate from high schools and would attend graduate school.

Insert Table 2 about here

Significantly more resilient Asian American students had perfect attendance than their counterparts. More resilient than non-resilient Asian American students also indicated that they never cut or skipped classes. More resilient than non-resilient Asian American students spent over three hours per week on mathematics homework and on additional reading not assigned by teachers. There was no significant difference between the two student groups on the amount of time spent watching television or listening to CD, tapes and radio, etc.

The overall MANOVA results indicate that students' perceptions of learning environment differed significantly between the two student groups ($df(6,353)$, $F=11.76$, $p<.001$).

Insert Table 3 about here

Table 2 presents the descriptive and univariate analysis of variance (ANOVA) results for students' motivation and perceptions of learning environment by student group. In general, both resilient and non-resilient Asian American students had positive perceptions of their learning environment in mathematics. Both groups of students scored high on the Achievement Motivation and Affiliation aspects and relatively low on the Satisfaction aspect. Resilient Asian American students' Academic Self-Concept and Achievement Motivation were significantly higher than those of their non-resilient counterparts. They also had greater Involvement, Satisfaction, and Affiliation. There was no significant difference in Parental Involvement between the two student groups.

A discriminant function analysis was performed to determine the extent to which the two groups differ with respect to their classroom learning environment, instructional learning environment, motivation, and background characteristics. To reduce the large number of variables examined in this study to a more parsimonious model, only those variables that were previously found to differ significantly between the two groups were entered directly into a discriminant model to see how well they were able to discriminate between the two groups of students. Descriptive discriminant analysis was used instead of predictive discriminant analysis because the purpose of the analysis was to describe the MANOVA results (Huberty & Barton, 1989).

The direct entry model examines the independent contribution of each of the variables in determining group membership. The model produced a Wilks' Lambda ($df(12,338)$ $F=14.89$) of .64 that was statistically significant at the $p<.001$ level. The discriminant function had a canonical correlation of .59, indicating a moderately strong relationship between the groups and the discriminant function. The squared canonical correlation coefficient for the model was .35 indicating that about 35% of the variance between the two groups can be explained by the 12 variables in this model. A classification matrix revealed that overall, 77% of the cases were

correctly classified, with 81% of the resilient student correctly classified and 73% of the non-resilient student cases correctly classified.

Table 4 reports both the standardized canonical coefficients and the structure coefficients from the discriminant analysis. The standardized discriminant function coefficients describe the impact or independent contribution of a given variable on the grouping variable, holding constant the impact of all the other discriminating variables. The variables of Time Spent Reading Additional Materials, Academic Self-Concept, and Time Spent on Homework were found to have the greatest impact, after adjusting for all the other variables in the analysis. The variables of Cut or Skipped Class and Satisfaction were found to have the least impact on the grouping variable.

The canonical structure coefficients for each variable provide an indication of the relative contribution of each variable to the overall discriminant function. It describes how closely a variable and the discriminant function are related. Six of the 12 independent variables included in the discriminant analysis had a value of .40 or greater and had the greatest practical significance for distinguishing between resilient and non-resilient students. These variables were Time Spent Reading Additional Materials, Academic Aspirations, Expectations for High School Graduation, Academic Self-Concept, Time Spent on Homework and Involvement. Cut or Skipped Class and Days Missed in School were negatively related to the discriminant function.

Discussion

The present study found that the social psychological dimensions of learning environment differed significantly between resilient and non-resilient Asian American students. Despite coming from the same urban schools and classrooms, some Asian American students have excelled in mathematics achievement while others have not. Among the six learning environment scales, five differentiated the two groups of students. Resilient Asian American students were more attentive in mathematics instruction and classroom activities and more attached to classmates than non-resilient students. This finding supports previous research that

found that the sense of student "involvement" and "belonging" reduces the feelings of alienation and disengagement and that this sens is very emphasized in effective urban schools (Lee, Bryk, & Smith, 1993; McMillan & Reed, 1994; Raywid, 1995). This affective domain is particularly critical for Asian American students who come from immigrant families and need to overcome language and cultural barriers.

Resilient Asian American students also had significantly greater intrinsic desire to succeed and earn good grades than their counterparts. They expected to do well in mathematics and exhibited pride in the classwork. These may shield them against their adverse circumstance and lead to better educational outcome. However, parents of both resilient and non-resilient Asian American students appeared to be equally interested and involved in what their children were doing in mathematics, although the reasons and nature for their involvement were not explored in this study.

Results of this study reveal that over three quarters of Asian American students spoke a non-English language before going to school. This implies that a majority of Asian American families were immigrants where a native language other than English was typically spoken at home. Although this study finds that speaking a non-English language before students' starting school is not a factor that distinguishes resilient from non-resilient Asian American students, further research needs to examine if this finding is valid across other subject areas, such as reading and language (Kennedy & Park, 1994). For example, Huang (1995) found that Asian American eighth graders from English speaking families scored significantly higher in reading tests than those from non-English speaking families, but there was no significant difference between these two groups in their mathematics scores.

Findings of this study identified some factors that are associated with Asian American students' resilience. Future research may need to (a) examine if these findings stand across different subject areas and grade levels, (b) include students from other ethnic groups for comparison, (c) include other learning environment variables such as teacher support, feedback, class order, and so forth, and (d) conduct observation on classroom instruction and interaction,

since the analysis showed that there were classroom related differences in learning environment. With adequate classroom, school, family, and community information in hand, educational researchers may concentrate on designing effective programs that alleviate educational problems in urban schools and enhance at-risk Asian American students' healthy development and learning.

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Table 1. Internal Consistency Reliability, Discriminant Validity, and ANOVA Results of Class Effect for the Six Scales

Variable	No. of Items	Alpha Reliability	Scale Intercorrelations						ANOVA	
			IN	AF	SA	PI	AS	AM	F	Eta^2
Involvement	4	.66		.05	.60	.33	.35	.52	1.47*	.19
Affiliation	4	.63			.12	.12	.15	.12	1.91***	.24
Satisfaction	4	.82				.25	.41	.46	1.30	.17
Parent Involvement	4	.64					.26	.34	1.26	.17
Academic Self-Concept	4	.43						.55	0.87	.12
Achievement Motivation	4	.47							1.23	.17

*p<.05. **p<.01. ***p<.001

Table 2. Background Information of Resilient and Non-Resilient Asian American Students

Indicator	Resilient (n = 180) f	%	Non-Resilient (n = 180) f	%	chisq.
Background Characteristics					
Spoke non-English language before you started going to school.					3.21
Yes	139	77.2	140	77.8	
No	41	22.8	40	22.2	
Have been held back a grade in school					23.03**
Yes	11	6.1	39	21.7	
No	169	93.9	141	78.3	
Math grade receive last year					132.06**
Mostly A's (90-100)	155	86.1	47	26.1	
Mostly B's (80-89)	20	11.1	95	52.8	
Mostly C's (75-79)	3	1.7	26	14.4	
Mostly D's (70-74)	1	0.6	7	3.9	
Mostly below D (below 70)	1	0.6	5	2.8	
Academic Aspirations					
Sure that you will graduate from high school					66.17**
Very sure	172	95.6	107	61.1	
Probably sure	6	3.3	57	32.6	
Probably won't graduate	0	0.0	7	4.0	
Very sure won't graduate	2	1.1	4	2.3	
Unspecified	0		5		
How far in school you will get					61.18**
Won't finish high school	0	0.0	10	5.7	
Will graduate from high school only	0	0.0	5	2.8	
Will attend college	4	2.2	29	16.5	
Will graduate college	42	23.3	65	36.9	
Will attend graduate school	134	74.4	67	38.1	
Unspecified	0		4		
Attendance Record					
Days of school you missed over the past 4 weeks					16.85*
Perfect attendance	144	80.0	110	61.1	
Missed 1 or 2 days	28	15.6	52	28.9	
Missed 3 or 4 days	4	2.2	13	7.2	
Missed 6 to 10 days	3	1.7	3	1.7	
Missed more than 10 days	1	0.6	2	1.1	

	Resilient		Non-Resilient		
	f	%	f	%	Chisq.
How often you cut or skip classes					18.32**
Never or almost never	177	98.3	156	86.7	
Sometimes, but less than once a week	3	1.7	15	8.3	
Not everyday, but at least once a week	0	0.0	5	2.8	
Daily	0	0.0	4	2.2	
Time Allocation					
Time spent on math homework each week					132.06**
None	2	1.1	13	7.3	
Less than 1 hour a week	29	16.3	60	33.5	
1 to 2 hours a week	56	31.5	72	40.2	
3 or 4 hours a week	61	34.3	15	8.4	
More than 4 hours	30	16.8	19	10.6	
Unspecified	2		1		
Time spent on additional reading					57.73**
None	6	3.3	30	16.9	
1 hour or less per week	46	25.6	84	47.5	
2 hours per week	50	27.8	38	21.5	
3 to 4 hours per week	46	25.6	19	10.7	
5 hours per week	32	17.8	6	3.4	
Unspecified	0		3		
Time spent on TV per day on weekdays					6.24
Don't watch TV	6	3.3	10	5.6	
Less than one hour per day	28	15.6	22	12.2	
1 to 2 hours a day	68	37.8	61	33.9	
2 to 3 hours a day	43	23.9	35	19.4	
Over 3 hours a day	35	19.4	52	28.9	
Time spent on TV on weekends					5.30
Don't watch TV	6	3.3	4	2.2	
Less than one hour a day	14	7.8	25	13.9	
1 to 2 hours a day	43	23.9	42	23.3	
2 to 3 hours a day	49	27.2	37	20.6	
Over 3 hours a day	68	37.8	72	40.0	
Time spent on listening to CD, tapes, radio, etc.					1.31
None	19	10.6	24	13.4	
1 hour or less per week	67	37.2	62	34.6	
2 hours	41	22.8	41	22.9	
3 to 4 hours	22	12.2	18	10.1	
5 hours or more per week	31	17.2	35	19.0	

* p< .01. ** p<.001.

Table 3. Descriptive and Univariate Analysis of Variance of Asian American Students' Learning Environments by Resilient vs. Non-Resilient Groups

Variable	Resilient (n=180) M	SD	Non-Resilient (n=180) M	SD	F
Involvement	3.22	.62	2.96	.56	18.57***
Affiliation	3.33	.54	3.10	.60	14.55***
Satisfaction	3.17	.69	2.86	.77	15.50***
Parent Involvement	3.10	.66	3.04	.71	0.52
Academic Self-Concept	3.39	.49	3.03	.45	50.49***
Achievement Motivation	3.37	.46	3.15	.49	20.22***

***p<.001

Table 4. Discriminant Analysis Results Between Resilient and Non-Resilient Asian American Students

Independent Variables	Standardized Canonical Coefficients	Canonical Structure Coefficient
Time Spent Reading Additional Materials	.51	.70
Academic Aspirations	.27	.69
Expectations for High School Graduation	-.27	.59
Academic Self-Concept	.41	.59
Time Spent on Homework	.30	.51
Involvement	.14	.40
Achievement Motivation	-.12	.39
Cut or Skipped Class	-.03	-.37
Satisfaction	-.09	.35
Affiliation	.20	.33
Days Missed in School	-.14	-.30
Not Held Back in School	.18	.25